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AIR COMMAND AND STAFF COLLEGE

STUDENT REPORT

CENTRALIZED CLASS A FLIGHT
MISHAP INVESTIGATION

MAJOR JAMES R. MCDONALD 88-1735

"insights into tomorrow"

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REPORT NUMBER 88-1735

TITLE CENTRALIZED CLASS A FLIGHT MISHAP INVESTIGATION

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Submitted to the faculty in partial fulfillment of
requirements for graduation.

AIR COMMAND AND STAFF COLLEGE
AIR UNIVERSITY
MAXWELL AFB, AL 36112-5542

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

A194 397

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT STATEMENT "A" Approved for public release: Distribution is unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) 88-1735	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION ACSC/EDC — 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) Maxwell AFB AL 36112-5542	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION — 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. — PROJECT NO. — TASK NO. — WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
CENTRALIZED CLASS A FLIGHT MISHAP INVESTIGATION (U)

12. PERSONAL AUTHOR(S)
McDonald, James R., Major, USAF

13a. TYPE OF REPORT	13b. TIME COVERED FROM ____ TO ____	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
		1988 April	33

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Although investigation of aircraft mishaps is a vital part of the USAF mishap prevention program, ~~yet~~ these investigations are usually conducted by individuals with little or no experience in this field. This leads to errors in the investigations and the mishap reports. This report looks at two alternative systems in use today. The first used by the Federal Armed Forces, FRG. And the second used by the US Army. The author then suggests a centralized program for the USAF. This program is based at the MAJCOM and is designed to meet Air Force needs and requirements. Recommendations for test program are also included.

Keywords. Accident investigations; Aviation accidents; Crashes.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☐ UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS	UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL ACSC/EDC Maxwell AFB AL 36112	22b. TELEPHONE (Include Area Code) (205) 293-2867 — 22c. OFFICE SYMBOL

DD Form 1473, JUN 86 — Previous editions are obsolete. — SECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

PREFACE

When an aircraft crashes it is vitally important that the questions of why and how are answered so that similar accidents can be prevented. That's the basic premise of USAF flight mishap investigations; finding causes to prevent other mishaps. Yet in most cases the investigation board for a USAF accident is made up of individuals with no previous experience with mishap investigation. This leads to problems with the investigation and the reporting of the mishap.

This paper looks at the current USAF investigation procedures and its problems. Then, two centralized investigation programs, one in the U.S. Army and one with the Federal Armed Forces, West Germany, will be examined. These programs use a central core of experienced investigators from the crash site talk-through to release of the final report. This leads to a high quality, accurate final report.

The report closes by suggesting how the USAF could adapt the centralized investigation to meet its needs and still retain the best features of the present system. The goal being improved mishap reporting leading to better mishap prevention.

The author would like to acknowledge the assistance of three professional safety experts who were instrumental in completing this report: Lt Col John R. Dickerson, USAF, currently Chief, Research Analysis Branch, HQ/AFISC, formerly Chief of Flight Safety, HQ/USAFE; Major Larry Hubatka, USAF, currently Chief Analyst for Operations Safety, HQ/AFISC, formerly Wing Flight Safety Officer, 51st TFW, Osan AB, Korea, and Mr. John Wenrick, GS-12, Safety Specialist, Investigation Division, US Army Safety Center, Fort Rucker, AL.

In closing the author would like to recognize the contributions of his initial advisor, Lt Col Arvid B. Malvick. In spite of the demands of command and personal hardship, he provided the author with encouragement, insight and feedback; the elements required to make this project a success.

ABOUT THE AUTHOR

The author entered the Air Force in 1973 receiving his commission from Officer Training School, Lackland AFB, TX. After attending Undergraduate Navigator Training and Navigator Bombardier Training he was assigned to the 51st Bomb Squadron, Seymour Johnson AFB, NC as a radar navigator. In 1977 he was selected to attend Undergraduate Pilot Training at Reese AFB, TX. After graduation he remained at Reese as a First Assignment Instructor Pilot (FAIP) in the T-37. During this tour he served in several positions including Class Commander. From there he transitioned to the F-4 and was assigned to Taegu AB, Korea. Enroute he attended the USAF Flight Safety Officer's (FSO) Course, Norton AFB, CA. At Taegu he performed the duties of both a squadron and base FSO. During this time he was the investigating officer on a Class "A" flight mishap. From Korea he went to the Defense Language Institute in Monterey, CA, where he studied German in preperation for an exchange tour to the Headquarters, Luftwaffe. Maj McDonald was assigned to the Directorate of Flight Safety, Federal Armed Forces, Federal Republic Germany for two years. During this period he worked in the accident investigation division and was involved in three major aircraft accident investigations. His other duties included liaison with USAFE flight safety, HQ/AFISC and other US safety organizations. A published author, he has written articles for professional journals, to include: The Navigator, "Window to the World: EVS and the Navigator", Summer, 1976; Air Scoop, "Nothing Special", February 1986; "A Different View", May 1986; Flugsicherheit, "Nicht Besonderes", 3/87. He receieved his BA from the University of California, Irvine (1972), and a MA from Central Michigan University (1976). He is a graduate of SOS in residence and is currently enrolled in the Air War College associates program.

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EXECUTIVE SUMMARY

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REPORT NUMBER 88-1735

AUTHOR(S) MAJOR JAMES R. MCDONALD

TITLE CENTRALIZED CLASS A FLIGHT MISHAP INVESTIGATION

I. Purpose: To propose an alternative flight mishap investigation program which will improve the quality of both the investigation and the reporting of these mishaps.

II. Problem: Quality mishap reports are vital to the USAF mishap prevention program and the continued low flight mishap rate. There are, however, continuing problems with the investigation and reporting of such mishaps. Problems which relate directly to the inexperience of the investigation board. The USAF continues to conduct its investigations predominately with individuals who, though trained, lack any experience. This leads to incomplete and incorrect reporting.

III. Data: Aircraft accident investigtion and reporting is a pillar of the USAF mishap prevention program. Yet the majority of the investigations are conducted by inexperienced individuals with only basic training in investigation. This often leads to reports which do not correctly identify causes, make resonable recommendations or meet the Air Force standards. Improving the program will require a major change to how these investigations are conducted. One way to ensure a professional investigation is to

use a central core of trained, experienced investigators for all mishaps. Both the Federal Armed Forces, Federal Republic Germany and the US Army have such a program. The centralized investigation board, dispatched from the safety headquarters, conducts the investigation, writes the report and follows up on recommendations. Procedures vary between the Army and the FRG but the basic premise is the same: professional investigators produce quality reports. The USAF tested a central investigation in 1978. Though AFISC felt the test was successful, objections from the MAJCOMs about manning and control prevented adoption of the program.

IV. Conclusions: Quality investigations and reporting require trained, experienced people. The USAF needs to find a way to adapt a centralized investigation program to its needs. The best way to do this is at the MAJCOM level where the safety office can assume the investigation authority. By using the FSOs already assigned to the MAJCOM safety office and augmenting the staff with maintenance and administrative support, a central investigative team can be created. The team can respond quickly from the headquarters to the crash site. The investigation can be conducted in a shorter time and the team can return to the headquarters to complete the formal report. This shortens the board process, cutting TDY costs and freeing other board members for duty. This proposal also answers the two objections from the 1978 test program while providing for improvement of USAF investigation.

V. Recommendations: The US Air Force should adopt a centralized investigation process based at the MAJCOM level. Detailed analysis of cost saving due to decreased TDY and cost of increased manning at the MAJCOM safety office must be conducted. A test program should be run at a minimum of two MAJCOMs, one flying heavy aircraft and the other flying fighters. HQ/AFISC should evaluate this test program based on cost per investigation, time required to complete the report and overall quality. The test program should be run one year to allow sufficient data for evaluation. After the test program, cost analysis and manning evaluation the program should be reviewed by all MAJCOMs for adoption.

Chapter One

INTRODUCTION

The business of the U.S. Air Force is to fly and fight but to do this effectively it needs all its aircraft. Thus prevention of aircraft accidents is a primary concern. "Mishap prevention is basic to keeping a combat ready posture." (9:7) Between 1983 and 1987 the USAF was successful in reducing its rate of major, Class "A", aircraft flight mishaps to the lowest rate in its history, an average of 1.66 per 100,000 hours of flying. (2:3, 3:15) That's an average of 56 aircraft per year for the five year period. (16:--) Yet with the rising cost of replacing aircraft the Air Force must continue to work to lower its mishap rate. The theoretical minimum, given the Air Force operational requirements, is approximately 1.2 mishaps per 100,000 hours. (2:2) One of the FY 87 safety initiatives was a ten percent decrease in operator error mishaps. (1:9) Achieving both goals will take efforts by everyone involved with operations and maintenance.

One of the ways the Air Force has reduced and can continue to reduce its mishaps is through detailed investigation and reporting. The flight mishap investigation board and its report identify the causes of the mishap and make recommendations to prevent similar occurrences. (10:7) Yet each year the majority of all Air Force aircraft mishaps are investigated by officers who have been trained for but have no experience in such investigations. This leads to errors that range from administrative to incorrect identification of the causes of the accident. (14:13-14) To overcome these problems the Air Force needs to change its investigation procedures.

This idea is not new. In 1974 a new concept calling for a central staff of trained experienced investigators was suggested to the Director of Aerospace Safety , Brig. Gen. Charles Yeager. The decision on this program was "deferred... for future study..." (14:26) A central investigation staff was formally proposed in 1977 by the Air Force Inspection and Safety Center (AFISC) and was tested 1978. Though this program never was adopted, it did expose some of the weaknesses with the current system. (14:26-28) The fact that there continues to be problems with the quality of the investigation demands that alternative investigation procedures be examined. (15:--)

The author believes that a form of centralized investigation which includes trained, experienced staff working for the MAJCOM may provide the answer to this problem. This paper will briefly examine the current USAF system looking at the investigation board make-up, the investigation process and the problem areas. It will then look at two alternative centralized investigation system currently in use, one by the Federal Armed Forces, Federal Republic Germany and the other by the U.S. Army. Both these programs use a core of professional investigators to conduct and report on aircraft mishaps. The organization, board make-up, investigation and reporting process and the advantages and disadvantages of each system will be discussed. The author will then propose a centralized system which should meet the basic criteria of the USAF while providing for an experienced investigative team to head mishap boards. Also manning levels and areas of responsibility will be discussed. The paper will close with recommendations including areas the author feels require further study yet are outside the scope of this project.

Lowering the mishap rate, saving valuable aircraft and lives is the goal of all mishap investigations. Improving the mishap investigation process will help achieve this goal. The Air Force needs to examine its procedures and attempt to find better ways of accomplishing its mission. The centralized mishap investigation board offers a better way.

Chapter Two

USAF FLIGHT MISHAP INVESTIGATION

Investigation of Class "A" flight mishaps in the USAF is managed by Headquarters, Air Force Investigation and Safety Center (HQ/AFISC) and is covered by Air Force Regulation 127-4. The actual investigation authority belongs to the major commander who normally calls together the investigation board. This chapter will look at that board, how it conducts an investigation and reports on the mishap, and the problems associated with this process.

The author is only concerned with the investigation process as it applies to Class "A" flight mishaps. These are mishaps that involve death, a destroyed aircraft, or damage exceeding $500,000. (10:21-22) This will serve as a point of reference in succeeding chapters, as the U.S. Army and the Federal Armed Forces, Germany have similar if not identical classifications. (8:11) In the USAF an investigation board is required for all Class "A" flight mishaps. The major commander may convene a board for lower categories of mishaps if indepth investigation is deemed necessary. In all cases the basic make-up of the board is dictated by AFR 127-4.

BOARD MEMBERS AND DUTIES

The investigation board is composed of voting and nonvoting members and is headed by the board president. The president is usually a colonel selected by the Major Commander from a list of candidates. This list is compiled by the MAJCOM safety office and lists those colonels who have attended a board presidents course. The training of board presidents is left to the individual MAJCOMs. (16:--, 10:23) The president oversees the investigation and acts as the commander's representative. Along with the president the other voting members of the board are the investigating officer, a pilot member current in the type aircraft involved, a flight surgeon, and a maintenance officer. Other required board members include a recorder, a life support officer and a safety advisor if a trained safety officer is not a member of the board. These members are nonvoting. Other technical specialists can take part in the board if the president desires. The board president is appointed from a organization other than the one which has had the mishap. The other board members also usually come from other units to prevent conflicts of interest. (10:23-24)

While the board president directs the board, it is the investigating officer who runs the actual investigation. This is a rated officer with four years experience who normally has attended the USAF Flight Safety Officer's course. (10:23) Every year the Air Force sends approximately 120 officers to this graduate level course designed not only to qualify these officers in mishap investigation but to train them as a flight safety officer (FSO) for wing and squadron positions. Most serve as a FSO for one to two years. (16:--) The average number of mishaps between 1983 and 1987 was 56 so not every FSO will have a chance to be a part of an investigation. And the opportunity to be involved in two investigations is even less. Most investigations are conducted by a first-time investigator. (16:--)

The other members of the board may or may not have training in mishap investigation. Each year approximately another 120 officers, many from maintenance backgrounds or rated officers, are trained in the two week Aircraft Mishap Investigation Course (AMIC). (16:--) This course covers the basics of mishap investigation and reporting. It is an excellent way for the MAJCOM to ensure trained individuals make up a board, but there is no requirement for board members to have this training.

THE INVESTIGATION

Notification and Response

When a mishap occurs the unit involved follows its mishap response plan which includes notifying the MAJCOM and conducting the initial investigation. In this early stage of investigation, perishable evidence such as fuel samples and toxicological testing are completed. Also, initial interviews with witnesses and survivors are conducted. (10:7, 9:21-22) At the same time the MAJCOM safety office is assisting the commander in forming the investigation board. Each MAJCOM maintains a list of qualified board presidents, investigating officers and other members. Once the commander has selected the board president, the remainder of the board members are selected and notified. They are relieved of other duties and report to the base nearest the crash. The average response time from notification until the board is in place is three days. (16:--) At this time all evidence collected by the interim board is turned over and the formal investigation is underway

The Investigation Process

The board members are relieved of all other duties so they may concentrate on the investigation. The investigation must be completed in 30 days. This includes the formal report and the final message. The board works to identify the causes of the mishap. The major areas of the investigation are: human factors, operations, maintenance and logistics. Each of these areas is examined in detail. When expert assistance is required the board president requests this from the MAJCOM safety office. Also representatives from the various aircraft manufacturers offer assistance to the board. As evidence is gathered the board begins work on the formal report. The members evaluate the evidence and try to build the sequence of events leading to the mishap. After they have agreed on the most likely mishap sequence they then work to identify those factors which caused the mishap. Once the voting members agree on the causes work begins on developing recommendations to prevent similar mishaps. The recommendations must be feasible and related directly to the causes. This is the most important part of the report. (10:--)

Reporting

The board has two tasks in reporting the mishap. The first is the completion of the formal mishap report. To provide confidentiality to the witnesses and the investigators this report has two parts: Part I, releasable to the public containing the factual information and Part II, which can only be used as part of the mishap prevention program. Part II contains witness testimony and the deliberations of the board. The confidentiality of Part II of the mishap report is of great concern to HQ/AFISC because they believe this is required to have an effective prevention program. (5:2-5)

> "Full and free disclosure is essential to the success of these [mishap] investigations. To achieve this desired freedom of disclosure, assurances must be given statements made will not and cannot later be used in civil, criminal or administrative action." (4:10)

The correct completion of the formal report is vital to maintaining this confidentiality.

Once the formal report is finished the board must then complete the final report which will be transmitted via message throughout the Air Force. This message includes a basic

scenario of the mishap, the findings of the board to include causes and recommendations. This is a succinct report to be used at all levels of flying organizations as part of their mishap prevention program. When complete the board president and the investigating officer present the two reports to the major commander. He will then approve and release the final report. If the commander is unsatisfied with the investigation the board may be reconvened to continue its work. When the commander accepts the report the board is released and the reports are forwarded to the appropriate agencies. HQ/AFISC receives the report and reviews the entire investigation. It will then issue a Final Evaluation, a statement of AFISC's evaluation of the board's findings, causes and recommendations.

PROBLEM AREAS

Mishap investigations are conducted to find causes and take preventative actions. (10:7) In order to be successful the investigation must be complete and accurate. Yet there continues to be problems with the quality of both the investigations and the reports. (14:13, 15:--) The problems range from placing privileged information in the wrong part of the report to faulty identification of causes to making recommendations that are not directly related to the mishap. (14:14-15) Many of the errors are caught by the MAJCOM. Yet during the AFISC final evaluation process it is not uncommon to have cause factors eliminated and new ones identified. This is after the final report has been released and units are using the reports in their mishap prevention programs. It is very important that the board does its job accurately, if the prevention program is to be effective.

The author believes the problem lies with inexperience of the investigating officer and board president. A study of investigating officers in 1983 showed that of 59 investigators only two conducted more than one investigation. Also the average time from the FSO course to the first investigation was 21 months. (14:10-12) As stated earlier FSOs serve in that position between one and two years so many may never investigate a mishap. (16:--) Board presidents have a similar problems in that once they have served as board president they will probable not serve in that position again. Thus when the investigation begins there will likely be a new investigating officer who's last training was over a year prior and a board president who has had very limited training and no experience. There are bound to be a few problems.

Chapter Three

GERMAN ARMED FORCES ACCIDENT INVESTIGATION

The German Armed Forces use centralized investigation for all major, Category II, (the equivalent of US Class "A" mishaps) aircraft accidents. The agency responsible for this is the Directorate of Flight Safety for the Federal Armed Forces. This chapter will examine the German flight safety program, the organization of the Directorate of Flight Safety, the makeup of the investigation board, and the investigative and reporting process. This section will close with a discussion of the advantages and disadvantages of this system and its applicability to the USAF. The chapter is based on the "zentrale Directive 19/6", Federal Armed Forces, FRG which describes accident investigation and on the author's experience as an exchange officer with the directorate from July 1985-July 1987. The author worked in the accident investigation branch as an F-4 specialist and was involved in the investigation or reporting of three Category II aircraft accidents during his tour of duty.

ORGANIZATION

The Directorate of Flight Safety works for the Luftwaffe Inspector General and is responsible for aircraft accident investigation in the Air Force, Army and Navy. It is responsible for all matters pertaining to flying safety. The directorate is organized similar to the USAF Directorate of Aerospace Safety, HQ/AFISC and is headed by a Brigadier General who is the final authority for all accident reports. There is a Colonel Deputy Director and four Dezenats (divisions).(13:--)

The divisions are designated A-D each having a Lieutenant Colonel at its head. Division A is responsible for the accident prevention and inspection program. This division produces two magazines, a monthly synopsis of minor aircraft mishaps and a bimonthly flying safety magazine, "FLUGSICHERHEIT". They also produce safety awareness training video tapes. Another function is the production of the annual accident summary. To fulfil the inspection function this division draws assistance from the other three divisions. Division B is the investigation division and will be covered in detail later. Division C is the technical division and is headed by an engineer. They are responsible for all the

technical aspects of flight safety including coordination on system safety and investigation of maintenance procedures and practices. A branch of this division is responsible for life support and has specialists in egress systems. Division D is roughly equivalent to Reports and Analysis at HQ/AFISC. They are responsible for all reports, data automation and analysis. They also provide the administrative assistance for investigations. (13:--)

The investigation division, Division B, has overall responsibility for aircraft accident investigations. The individuals in this division serve as the accident board president on all major aircraft accidents and can be assigned to investigate Category I or Class "B" equivalent accidents. The division is assigned twelve investigators who are currently qualified flight officers, pilots or weapons system officers, who have served at least one tour as a flight safety officer at the Wing level. Most are highly experienced in flight safety having worked in the field more than five years. The investigators maintain currency in their particular aircraft by flying approximately seventy hours a year. This is roughly equivalent to a USAF RPI 6 position. During the author's assignment to this division, the average time in the directorate for investigators was five years, with three individuals having more than seven years experience. The majority of the investigators had been part of an investigation board while at the wing level. The duties of this division, along with aircraft accident investigation, include reviewing all aircraft accidents and incidents, writing the final accident investigation reports and preparing articles for the monthly accident summaries.

The investigators in Division B serve as the board president and leader of the investigation team. Other members of the team come from the other divisions; one or two technical investigators from C, a life support specialist from C, and admin support from D. They are joined in the field by the FSO from the wing which had the accident, a pilot current in the aircraft involved, a flight surgeon and a maintenance officer. Their duties are very much like those of their USAF counterpart. The investigation is centered around the team from the directorate.

THE INVESTIGATION

Notification and Response

The safety directorate is normally notified by telephone by the unit nearest the crash. Once notified, the duty officer follows a checklist which includes notification of the office

of the Inspector General of the Luftwaffe and other agencies. Immediately the investigation team is formed. While the team is preparing, flight arrangements are made with the co-located airlift squadron and within two hours of notification the team is underway to the base nearest the crash. The normal response time for the team is between two and three hours depending on where the accident has occurred. When an accident is outside the Federal Republic response may be slightly longer. Investigation teams have responded to accidents in Canada, Great Britain and to other nations on the European continent. Even in the case of Canada the team was on scene within twenty four hours.

The Investigation Process

Upon arrival at the base nearest the accident the team is transported to the crash site for an initial walk-through. After the on site inspection, which normally takes about one hour, the board president along with the local FSO will interview the survivors. Interviews are conducted with witnesses and survivors within 24 hours. Much as with the USAF system, interviews are confidential and those being interviewed are informed that their statements are to assist in the safety investigation and are not to be used in legal proceedings.

Following the initial interviews and the on scene inspection the board president will organize the investigation board. This may have to wait until the next day when the unit involved is not located near the crash site. After the arrival of the unit's board members, the president will conduct an in briefing to bring the new members up to speed. For the next three to four days these individuals will work to gather data from the crash site, local witnesses and air traffic control. At the end of this period, all physical evidence has been collected from the crash site and the board president normally authorizes cleanup of the site. Once site clean up begins the president will dissolve the board with instructions for each member to complete their portion of the investigation. The directorate team will normally return to the safety center. The investigation is thus broken down into its individual elements.

All board members conduct individual investigations into specific areas of responsibility. The Wing FSO coordinates the base level investigation working with the pilot and maintenance members. These investigations into aircraft maintenance history, flight crew histories, operations and training are to be completed within thirty days. This is sometimes difficult because the board members must also accomplish their primary duties at the same time. The board president at the

directorate monitors progress and makes plans to reconvene the board within thirty days of the mishap. The other board members at the directorate track the technical investigations conducted at the aircraft depots. At the president's direction the board is reconvened to compile the individual reports and then to establish causes and make recommendation. This process takes, on average, one week at the end of which the board has completed the formal report. This done, the board is dismissed and the team returns to the directorate with all copies of the report. The investigation is completed but the report is not yet ready to be released.

Reporting

Upon return to the Directorate of Flight Safety the board president will brief the division Chief, the deputy director and director on the findings of the board. The report is then turned over to another member of the investigation division who will write the final report. This is a control mechanism. The officer who is writing the final report is not tied to the causes and recommendations of the investigating board. If after reviewing the report he feels that the cause factors are not substantiated or that a secondary cause should be the primary he works with the investigating officer and can rewrite the report. This final report is reviewed within Division B. and once the division chief, the board president and the author are in agreement it is presented to the director. Again the report is thoroughly reviewed, with the director having final approval. Once the report is approved it is officially released and no further review is required. At this point those agencies named to implement recommendations begin their process.

ADVANTAGES AND DISADVANTAGES

The major disadvantage of the German system is the time taken between the accident occurrence and the issuance of the report. As noted earlier, the regulations call for the board to be reconvened within 30 days. Yet extensions are freely given on this time limit and the norm is much longer. As an example, an accident on which the author worked occurred in March and the board reconvened in June. These delays are due to many factors including scheduling conflicts, delays in individual reports and slow technical reporting by depot agencies. Once the report is completed by the board there is another delay while the report is written. Again this is due to several factors including manning and the frequency of accidents. Over the last five years all aircraft accidents have been decreasing in the Federal Armed Forces, yet there

were 20 accidents in 1987. In that year there was a manning problem with only 10 investigators, including the division chief in Div. B, available for duty. Of those ten, six were qualified investigators on either helicopter or fighter aircraft. The majority of investigations involved these two types of aircraft. This led to delays in reports up to six months, as investigators were invovled in an investigation every other month.

While the time required to get the report out is a major drawback, there are advantages with the German system. The first is the quality of the reports. Overall the reports are clear, accurate, and insightful. The final report as it is released requires no further review as do USAF reports. Thus, the agencies tasked by the recommendations begin work as soon as the report is released. The high quality of the reports is a direct result of the experience of the members of the investigation team. As stated earlier, the officers and NCOs at the directorate usually have been extensive safety experience before coming to the staff and they remain at the center for several more years. They gain indepth experience with flight safety and particularly with accident investigation. This experience pays off in quality reports. That kind of experience is what is missing from the current USAF investigation process. By having the core of investigation board at the directorate the response time to an accident is cut from days in the USAF case to hours. This means that time critical evidence is gathered by the primary investigators.

Another area which is an advantage to the Federal Armed Forces but would not be workable given current USAF manning policies is the long tenure of the investigative staff. As mentioned several of the investigators had more than five years at the directorate. The retiring division chief of Division B had been at the directorate for twelve years. USAF personnel could not and in most instances would not desire such a long tenure.

Chapter Four

U.S. ARMY ACCIDENT INVESTIGATION

The U.S. Army, like the Germans, uses a centralized investigation team for all Class "A" aircraft accident investigations. They can also be called in for Class "B" accidents. The centralized accident investigation (CAI) team is dispatched from the U.S. Army Safety Center (USASC) at Fort Rucker, Alabama. The procedures used by the Army differ from those seen in the German example and they offer a program which is more applicable to the USAF situation. This chapter will examine the organization of the USASC, the investigation process and the pros and cons.

ORGANIZATION

The Army Safety Center has five Directorates and much as with HQ/AFISC, it is responsible for all aspects of safety. The Directorate for Research, Analysis and Investigation, headed by a Colonel, is of concern to this report. The Investigation Division of this Directorate is made up of seven teams, with two teams on two hour alert at all times. An investigation team is composed of a Major or Lt. Colonel, who acts as board president, a warrant officer who acts as recorder and a civilian safety specialist. All three individuals have aviation and flight safety backgrounds. (17:--)

Responsibility for investigation of aircraft accident rests with the commander of the USASC and he provides the CAI for "selected aircraft accidents." (12:1-4,4-13) The criteria for determining what type of accident, Class "A" or "B" are the same as those used by the USAF (8:i1) Also as with the USAF and the FRG investigations are to identify causes and "provide recommendations that will remedy the causes and minimize the chances of similar recurrences." (11:1-1)

INVESTIGATION PROCESS

Notification and Response

The Safety Center is notified of all Army aircraft accidents worldwide. As stated in the organization section

there is always a team on standby to respond to accident notification. Normal response takes two hours until the team is in the air. The center has access to two C-12 aircraft for travel up to 1000 miles. Beyond that range the team will travel via commercial airline to reach the nearest base to the crash site within 24 hours. (17:--) When the team from the center arrives they are joined by other individuals that makeup the remainder of the investigation board.

The Investigation

Upon arrival the board president will in brief all board members. Also at this time the unit Aviation Safety Officer (ASO) briefs the board on what preliminary actions have been taken. From there the board proceeds to the crash site for a walk through to see the "physical layout" and have a "mental picture" of the area. (11:2-1) The board president then directs the investigation along two paths creating the human factors working group and the material factors working group. The human factors group is usually headed by the civilian safety specialist and includes at a minimum, an instructor pilot or standardization pilot in the mishap aircraft and a flight surgeon. A weatherman may also be included in this group. The material factors group is headed by the warrant officer. Other members include a maintenance officer and technical experts as required. The technical experts need not be added to the board. (17:--, 11:2-1)

The human factors group looks into all aspects of the flight crew. Specific areas of responsibility for the IP and the Flight Surgeon are laid out in DA Pam 385-95, Aircraft Accident Investigation and Reporting and a checklist has been published by the USASC to assist the team members. The same is true of the material group. In addition, the members of the team from the center are all highly experienced investigators. The team works an average of seven to ten days together collecting data and preparing individual reports on specific areas. Near the end of that time the board meets to deliberate on causes, make recommendations and complete forms. The board deliberations cover all factors affecting the mishap. When all members are in agreement on the causes and have established recommendations the board is closed. The board president will then present an outbriefing to the commander of the unit having had the accident. At this time the Board is dissolved and the team returns to the center to complete the report. (17:--)

Reporting

One member of the team is tasked to complete the report. After approximately two weeks when the report is in final draft form a Quality Review Board is held at the safety center.

The QRB includes the members of the original team, experts in the accident aircraft assigned to the center who did not take part in the investigation, and the director. The report is reviewed to ensure accuracy, clarity, and logic. If a question arises about a cause factor, the QRB does have the power to reconvene the accident board to review its findings. This occurs very infrequently because the three member team from the center are experienced investigators and experts in flight safety matters. (17:--)

Following the QRB the report is finalized, all corrections in format are made, and the report is then presented to the Commander of the USASC. He serves as the releasing authority. The report is sent out to the various levels from army to battalion. The entire process is to be completed within sixty days of the mishap. At any time during the investigation or reporting process that a imminent safety hazard is discovered the board president can, through the USASC, send out safety advisories or in the case of a major mechanical problem with an aircraft type, can request HQ Army ground the entire fleet of aircraft. Therefore, even though the reporting process takes longer than the USAF's, safety critical information does have a channel for release. (17:--)

ADVANTAGES AND DISADVANTAGES

The disadvantages of this particular system, as with the German system, are a result of manning levels. As stated, the Investigation Division is manned with seven teams. These teams are not always made up of the same three members. Because of the type aircraft involved or specific system expertise a member of one investigation team can return from one accident only to be sent out on another. This limits who authors the reports and some delays in reporting can be expected. Generally though, all reports are completed within 60 days. Over the last five years, 1983-1987, the number of aircraft accidents has averaged 38 per year, with 34 the fewest and 45 the most. This means each team member averages five to six investigations a year. Requiring 60 days from crash to report it can be seen that the team members are busy the entire year. Adding in such things a leave, training and additional duties, the final reports can easily get backed up. Consideration is being given to expanding the staff to ten teams. (17:--) Still, overall the CAI has advantages which out way the disadvantages in the author's opinion.

The major advantage of the Army system, as with the German system, is the high quality of the reports. This is due to the experienced investigation team. Their ability to respond within 24 hours to a accident avoids the need for a interim

board and time critical information, including witness testimony and crash site investigation, can be conducted by trained, experienced investigators rather than the local FSO who is normally not experienced in such investigations. Other advantages of this system include: 1. The completed report requires no further review because it is produced by the Safety Center. 2. The basic investigation in the field is completed in 7-10 days lowering the cost of TDY. 3. The Quality Review Board identifies any discrepancies or problem areas before the report goes to the field, increasing the validity of the report. Also by using civilian safety specialists (GS workers) continuity is added to the program because they are not subject to the frequent PCS requirements of the military. Continuity combined with experience ensure that the investigations are accurate and the reporting is precise.

Chapter Five

USAF CENTRALIZED MISHAP INVESTIGATION

The author has thus far examined the problems with the current USAF system of mishap investigation, problems that center on the quality of both the investigation and the reporting. Two centralized investigation system in use today were examined. While both had disadvantages for the USAF, each had the major advantages of high quality investigation and rapid response of a professional experienced investigation staff. This chapter will propose how the USAF might change current procedures and establish a centralized investigation system. First, the author will briefly discuss the USAF centralized investigation test program of 1978. Then he will discuss the organization, investigation process and advantages and disadvantages of the proposed MAJCOM centralized investigations. In this discussion the proposal will be applied to the US Air Forces, Europe (USAFE) safety office with which the author often dealt while assigned to the German safety center.

As has been mentioned, the Air Force has attempted to use a centralized investigation system during a test program in 1978. The program was originally presented to the MAJCOMs as a way to lower the mishap rate. At TAC's request a test program was run involving TAC and ANG units from January to September of 1978. HQ/AFISC investigated five mishaps involving ground collision. While the program was deemed to be a success by AFISC, saying "The AFISC-led boards produced well-written reports in a shorter time.", major objections to the program were raised by the MAJCOM. In particular, the MAJCOMs wished to maintain control of investigations rather than having HQ/AFISC responsible. Also, the commands were concerned about manning requirements and career management of investigators. (14:27-28) The program proposed here will answer these objections.

ORGANIZATION

The author proposes that the central investigation team would be assigned to the MAJCOM, as part of the safety office. The investigation team would consist of a board president, a maintenance officer and a recorder. The board president would be a senior Major or Lt Col, a rated officer with a tour as a

FSO prior to being assigned to the staff. The maintenance member could be either an officer or NCO with a minimum of seven years experience in maintenance and preferably, experience as a safety representative in a maintenance squadron. NCOs would be trained and receive the 241XO career field identification. The recorder would be an admin specialist from the MAJCOM safety staff. These individuals would form the core of the investigation board. They would, as in the Army example, be on call with a two hour response time as the target. The board presidents would maintain currency in a major weapon system within the command flying as a RPI 6. They would not be tied to investigating mishaps that involved their primary aircraft. The maintenance staff should also have individuals with experience on the major weapon systems of the Command.

Application to USAFE Flight Safety

The Flight Safety office at HQ/USAFE has assigned five flight safety staff officers,(X1455) who currently coordinate the USAFE mishap prevention program. The Chief of Flight Safety is a Lt Col and the other members of the staff are Majors. They fly at a RPI 6 rate, maintaining currency in the various weapon systems in the command. They all have previous experience as FSOs and have been involved in mishap investigations. Currently the chief does not fly. (15:--) Under the proposed system each of the individuals could fill a board president position. The flight safety office does not currently have adequate admin support to meet the proposed plan, having only one secretary assigned. Also while there are maintenance officers and NCOs assigned to the ground and weapons sections of the office more maintenance personnel would have to be assigned to meet the proposal requirements.

While the administration and maintenance support would need to be expanded, the staff of board presidents is adequate to handle the investigation requirements. The USAFE mishap rate has, over the last five years averaged 3.7 mishaps per 100,000 hours or seven mishaps a year. (16:--,6:--,7:--) Thus each board president would conduct a minimum of one investigation per year, more probably two. If the positions were filled as they are now by individuals who have investigation experience it would give USAFE experienced, qualified direction in all investigations.

Measures to ensure that the investigation team was properly trained and had experience with investigation procedures would be the responsibility of the MAJCOM and the Military Personnel Center (MPC). Selection to the staff would need to take into account previous experience in flight safety to include participation in an investigation. The rated

officers would have to have performed duties as a FSO, as well as serving on a mishap board. The maintenance member should have attended AMIC as a minimum. Once assigned to the staff, each new member would be required to observe one mishap investigation before he/she could participate as a primary member. Thus each staff member should have a minimum of one investigation with the board president having two, one as board member, and one observing as a staff member.

THE INVESTIGATION PROCESS

Notification

The MAJCOM safety office would be notified of an aircraft mishap as it is currently. Upon notification the members of the investigation team "on call" would be dispatched to the base nearest the crash sight. A team from USAFE Headquarters could reach any location within the command in twenty four hours if not sooner. The team would be joined in the field by other members assigned to the board. As with current procedures, these members should not be from the unit that has had the mishap. The other positions would be: A pilot current in the mishap aircraft, preferably with investigation training,(an FSO would be a good candidate), a maintenance member current in the mishap aircraft, a flight surgeon, a life support officer, technical advisors as needed and a representative of the unit that lost the aircraft. The duties and responsibilities of these members would remain as they currently are.

The Investigation

Once the board was formed, the investigation would run similarly to current procedures. The major difference would be the length of time the team stayed in the field. As stated in Chapter Four, the U.S. Army investigations take between 7-10 days in the field. Because the investigation team is headed by experienced individuals the basic work should be completed in a shorter period of time than currently required. This was shown to be true during the 1978 pilot program run by AFISC. (14:26) For planning purposes the team would stay in the field for two weeks and then return to headquarters to complete the report. As with the Army system, the board would collect all evidence, establish the mishap sequence, assign causes, and make recommendations during this time. This would be the preliminary report. Before returning to headquarters, the board president would outbrief the commander of the unit with the mishap and intermediate commanders up to the MAJCOM on the boards preliminary findings, causes and recommendations.

Reporting

Returning to the headquarters it would be the responsibility of the board president to complete the formal report and the final message. If he or the other members of the investigation team were not current in the mishap aircraft they would work closely with those on the staff who were. The president would be given two weeks from the team's return date to complete the report. During this time the team members would be relieved of all other staff duties. When the report was completed, it would be reviewed by the safety staff, to include the Chief of Flight Safety and then it would be presented to the commander. The commander would be the final releasing authority. The report would then be sent to HQ/AFISC for final evaluation.

ADVANTAGES AND DISADVANTAGES

The advantages for a centralized system remain, as was seen in the examples and the AFISC test, higher quality reports in less time. Improved reporting and investigation are the goals of changing the present system, but this proposal also offers other side benefits. The first and most obvious is in TDY funds. By design, the field investigation will be two weeks or less. This should halve the TDY costs of current investigations which require thirty days. Because the team is assigned to the MAJCOM additional travel costs from the crash site to the MAJCOM and return to the home base, as is currently paid for the board president and the investigator, will be cut. Cost savings will depend on the command, the mishap frequency and other requirements of the command. Further analysis of costs should be accomplished.

A second advantage is in terms of lost duty time while assigned to an investigation board. As was discussed in Chapter Two, currently the board members are relieved of all duties for the duration of the investigation, usually thirty days. Thus a colonel, two rated officers, a maintenance officer, a life support officer and a flight surgeon are away from their primary duties for a month. Using the MAJCOM centralized team the colonel and one of the rated officers would not be involved at all and the remainder of the board would miss a maximum of two weeks.

Another benefit from the reduced number of board members and shortened investigation is a reduction in additional duties for flying personnel. By having a unit FSO serve as the pilot member, he/she is completing a primary duty while gaining experience in investigation and widening the pool of eligible officers to move to the MAJCOM staff. At the same time, one more pilot is available for flying duties in the squadron.

The major disadvantage to this propcsal is the increase in manning required at the MAJCOM level, specifically the need for maintenance and admin support. It is not within the scope of this paper to cost out the additional manning. This will have to be examined and compared with cost savings from the shortened TDY. The addition of experienced and trained maintenance personnel to the MAJCOM safety staff would bring benefits beyond mishap investigation. Their expertise would also benefit the prevention and inspection programs.

By using a MAJCOM centered investigation the problems addressed in the 1978 test program can be overcome. The MAJCOM control is evident. As for manning, as seen in the USAFE example, the primary duty of board president can be filled at current manning levels. Other commands would base their manning on the frequency of mishaps and an optimum number of investigations per officer. The staff FSO can easily meet all the requirements of the proposed system. Career management, assignment duration and promotion potential should not change from the current situation. As for the other positions, the maintenance member does not need to work in the flight safety office, but could be assigned to any branch within safety, such as, ground or weapons. An increase in admin support could easily be justified when the increased work load of reporting is added to the other duties of the safety office. Further study of manning will be required.

Chapter Six

RECOMMENDATIONS

Centralized investigation of aircraft flight mishaps offers the Air Force improved investigation and reporting. The proposed MAJCOM level program offers the advantages of a professional investigating team while allowing the major commander to maintian control. The proposed program also will save on TDY costs and reduce the time board members are away from their primary duties. For these reasons, the Air Force should further evaluate the proposed system.

The Air Force should run a year long test program involving a minimum of two MAJCOMs, one possessing heavy aircraft and the other with fighter aircraft. The author suggests, the Strategic Air Command and US Air Forces, Europe serve as the test commands. The board president would be from the MAJCOM safety office, as in the proposed system. Because current manning levels may not support the maintenance and administrative requirements, each command would designate personnel to be team members, ensuring they received proper training. HQ/AFISC would evaluate the performance of the teams against other MAJCOMS who would use current procedures. The evaluation criteria should include: timeliness of reports, quality of investigations and reports, where possible comparison of TDY costs and lost duty time due board participation.

While the test program is being conducted the Military Personnel Center in coordination with the MAJCOMs should examine the manning requirements of the new system. These requirements need to take into account: number of mishaps per year, cross training of NCOs into the 241X0 career field and other requirements of the MAJCOM safety office. A cost analysis comparing savings in TDY funds compared to increases in manning, where required, should also be conducted.

Upon completion of both studies HQ/AFISC working with the MAJCOMs would make a final evaluation. If positive, the program, would with HQ/USAF approval be implemented. The author believes that centralized investigation at the MAJCOM offers the best alternative to improve safety investigations.

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